24.5°C. the temperature alone is insufficient to induce spawning of the female, which, however, readily responds to the addition of sperm. From these observations an inference can be made that sperm plays the rôle of a "key" that unlocks a certain mechanism which in turn initiates in the female a chain of reactions and that the same results can be obtained also by a physical factor (increase in temperature). The reaction is, however, highly specific in the sense that under certain temperature conditions (between 20 and 24.5°C.) it appears to be provoked only by the sperm of the same species.

There is no doubt that the sexual reactions just described fall in the category of chemical stimulations, which play an important rôle in the life of marine organisms, especially of the sedentary forms like the oyster which possess no organs of vision, but have a well developed chemical sense, and are able to detect slight concentrations of various substances.

The few examples discussed in the present paper show very clearly that many problems of oceanic biology can be studied from a biochemical point of view. We may look upon an organism in the sea as part of a complex chemical cycle in which a given form is only one of the links in a long chain of cyclic reactions; or we may study it with the purpose of understanding the factors controlling its propagation, development, functioning of its body and peculiarities of its behavior. In all cases we are dealing with biochemical problems which can be attacked by an experimental method. We know that marine forms play a definite rôle in the chemical cycles of various elements occurring in sea water, and that on the other hand they are very delicately adjusted to their particular habitats. It is our hope that an understanding of their work and of the mechanism of their adjustment can be reached through biochemical and physiological studies which open up new fields of research and should lead to the solution of problems which the descriptive methods, so generally used in oceanography, were unable to solve.

ZOOLOGY.—*On a new Cyprinoid from South Dakota.*[1] SAMUEL F. HILDEBRAND, U. S. Bureau of Fisheries. (Communicated by WALDO L. SCHMITT.)

An apparently undescribed species of the genus *Hybognathus* occurs among a lot of cyprinoids submitted for identification by Dr. E. P. Churchill of the University of South Dakota. The writer takes pleas-

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[1] Published by permission of the U. S. Commissioner of Fisheries. Received March 29, 1932.

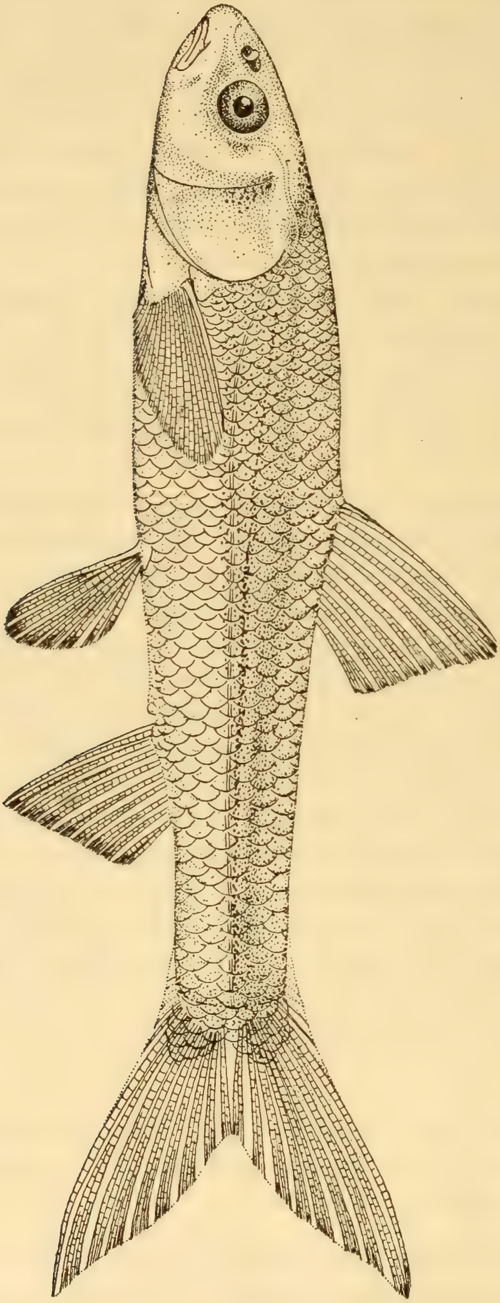

Fig. 1. *Hybognathus churchilli.* Total length, 71 mm. Drawn from the type by Louella E. Cable of the U. S. Bureau of Fisheries.

ure in naming this fish for Doctor Churchill who collected the specimens and who has made an extensive study of the fishes of South Dakota.

Hybognathus churchilli sp. nov.

Type No. 92248 U. S. National Museum; length 71 mm.; Cheyenne River, S. D.

Description of the type.—Body very elongate and slender, not strongly compressed, about three-fourths as broad as deep at origin of dorsal, the greatest depth contained in length to base of caudal 5.2 times; the peduncle compressed, its depth 2.3 in head; head low and rather broad, 4.1 in length of body to base of caudal, its depth at middle of eyes 2.3 in its length to bony margin of opercle; interorbital moderately convex, 3.5 in head; eye small, 5.6 in head; snout moderately conical, projecting about half an eye's diameter beyond the mouth, its length 3.7 in head; mouth slightly oblique, the gape reaching almost opposite posterior nostril; scales small and thin, especially reduced in advance of dorsal, 41 oblique rows running upward and backward between upper anterior angle of gill opening and base of caudal, 6 complete rows between origin of dorsal and lateral line, 4 between origin of anal and lateral line, 20 oblique rows crossing the back in advance of dorsal; dorsal with 8 branched rays the longest rays a little shorter than head, none of them produced, the fin having no high lobe anteriorly, its origin slightly nearer tip of snout than base of caudal; the caudal deeply forked, the lobes pointed and of nearly equal length; anal with 8 branched rays, a little lower than dorsal, its origin below tips of the longest rays of the dorsal when deflexed; ventral fins smaller than the pectorals, inserted slightly behind the vertical from origin of dorsal; pectoral fins failing to reach base of ventrals by a distance equal to length of snout, 1.3 in head.

Color after preservation in formalin slightly brownish above, with dusky punctulations, paler below and without punctulations (the sides no doubt are silvery in life, although this no longer is evident); a dusky vertebral streak in advance of dorsal; a slight indication of a dusky lateral band; the fins unmarked. (Fig. 1.)

Variations.—The variations within the species, as far as shown by 10 paratypes, are not pronounced. The following proportions and counts give the range within the specimens at hand: Head 3.9 to 4.25; depth 4.9 to 5.6 in standard length; eye 5.0 to 5.75; snout 3.1 to 4.0; interorbital 2.7 to 3.5; depth of head at middle of eye 2.0 to 2.4; caudal peduncle 2.2 to 2.7 in head. D. 8; A. 7 or 8; scales 18 to 21 before dorsal, sometimes crowded, irregular and difficult to enumerate, 40 to 44 in lateral series, 6 complete rows above the lateral line and 4 below it, counted respectively at origin of dorsal and of anal. Pharyngeal teeth in 3 specimens examined 0,4–4,0, compressed and slightly hooked at tips. Peritoneum jet black; intestine long and coiled. Origin of dorsal usually equidistant from tip of snout and base of caudal, occasionally slightly nearer the snout; the anterior rays of the dorsal sometimes somewhat produced, seldom sufficiently to make the fin falcate; ventral fins inserted under or slightly behind vertical from origin of dorsal.

Relationship.—The present species apparently is more slender than others of the genus, and the scales are small, being especially reduced in advance of dorsal. Comparing the present species with *H. nuchalis*, the other common local species, it is evident that the body is more slender (the range in depth in 7 specimens of *nuchalis* being 4.36 to 4.9); the eye is smaller, a difference which is most evident when specimens of the same size are compared, for example, in 3 specimens of *churchilli* all about 80 mm. long the eye is contained in the head respectively 5.5, 5.5 and 5.28 times, whereas in *nuchalis* in 3 specimens of about the same length the eye is contained in the head respectively 4.4, 3.85 and 4.3 times. The scales, especially in advance of the dorsal are larger, the range in 7 specimens of *nuchalis* being 14 to 15 in advance of dorsal, 35 to 38 in a lateral series, and 5 above the lateral line and 4 below it, counted respectively at the origin of the dorsal and origin of anal. The snout projects a little more strongly beyond the mouth in *churchilli* and the anterior rays of the dorsal are rather shorter, not forming a definite lobe.

The specimens of the present species were compared with 7 type specimens of *H. argyritis*, recorded from the upper Missouri basin, and originally described from the Milk River. The present species differs from that species also in the more slender body and smaller scales. In *argyritis* the snout projects beyond the mouth even more strongly than in *H. churchilli*.

Specimens of *Hybognathus churchilli* studied.—a. Seven specimens (including the type), ranging in length from 62 to 105 mm., from the Cheyenne River, near the mouth of Cherry Creek, taken July 15, 1928. b. Three specimens, ranging in length from 63 to 65 mm., from the White River near the town of White River, taken June 18, 1928. c. One specimen, 78 mm. long, from Bad River near Midland, taken July 16, 1928. The specimens were all collected by Dr. E. P. Churchill, who informs the writer that the Cheyenne and White Rivers are shallow, swift alkaline streams with little vegetation, whereas the Bad River is not alkaline, is sluggish and supports considerable vegetation. *Hybognathus nuchalis* also was taken in these rivers.